



Fig. 1

Fig. 2

Fig. 3

Fig. 4.

170-160.43

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EVANS' COMPLETE SPECIFICATION.

Evans' complete spec.

BRITISH

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416

170-160.43

1 sheet

(Back + Primaries)

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A.D. 1898

Date of Application, 15th Aug., 1898

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PROVISIONAL SPECIFICATION.

Improvements in and relating to Screw Propellers.

I, ARTHUR FREDERICK EVANS, of 11, Brunswick Walk, Cambridge, Engineer, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in screw propellers and has special reference to means and devices for varying and reversing the pitch of said screw propellers.

The object of this invention is to provide a means whereby the blades of the screw propeller are fitted into the boss in such a manner as that they are well supported in the boss and the blades can be readily removed or replaced without disturbing any of the mechanism, and if required, the whole of the propeller can be dismantled and removed by the simple process of unscrewing. Further, these improvements relieve the shaft from any unusual strains that may occur.

In carrying this invention into practice I use two, three, or more blades as may be convenient. I provide a propeller boss fixed on to the propeller shaft and to the stern post of the boat or vessel in the manner to be hereinafter described. This boss is preferably cylindrical in shape and terminates at the outer or aft end in a cone. Two or more recesses are provided according to the number of blades, which recesses are turned in the boss at right angles to its axis, to a depth sufficient to receive the stem of the propeller blade and at the inner end of each recess a smaller hole is bored and fitted to receive the end of the stem aforesaid. The bottom of each propeller blade has a collar or shoulder and terminates in a gudgeon or stem, having at its end the neck hereinbefore mentioned. I provide a gland which is screwed into the recess aforesaid which gland is bored out to receive the said stem which revolves in it the said gland having a shoulder or flange which rests on the surface of the boss.

The bottom of the said stem of the propeller blade is provided with a bush or sleeve, firmly secured and fixed to the stem by a taper pin or otherwise. This bush or sleeve is turned to exactly fit the space and is also deep enough to fit the recess between the underside of the gland and the bottom of the recess so that the upper and lower surface of the said bush or sleeve bears respectively against the gland and the bottom of the recess. On the outside of the said bush or sleeve, grooves are cut parallel to its axis, thus forming a pinion of the said bush or sleeve. This pinion so formed is actuated by two rods which serve the purpose of racks in the following manner:—Two holes are bored in the boss parallel to its axis, and which slightly intersect the circumference of the circle of the recesses aforesaid. Inserted in these holes are rods, which are cut on one side to form a rack which engages with the pinion, bush, or sleeve aforesaid. These two rods or racks are secured to a lug or flange forming part of a sleeve or bush which envelops the propeller shaft and is prolonged to the inside of the boat.

This sleeve or bush which of course revolves with the shaft is carried on bearings in the usual manner and is actuated laterally by a reversing or regulating lever, with a grooved sleeve and loose clamp, or any convenient means for controlling

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Evans's Improvements in and relating to Screw Propellers.

and regulating the fore and aft motion of the bush or sleeve on the propeller shaft, the effect of which is, that the racks engage the pinions and so cause the propeller blades to revolve, and thus the pitch of the blades is altered or reversed as may be required, as by this arrangement the blades can be rotated on their axes the whole or any part of a circle so that any lateral movement of the sleeve on the propeller shaft will cause the racks to revolve the pinions, and thus revolve the propeller blades on their axes. 5

A stuffing box is provided inside the boat between the sleeve aforesaid and the shaft to prevent the water getting into the boat or vessel.

The attachment of the propeller to the boat is effected in the following manner:— 10
On to the stern post of the vessel or other convenient fixture a flange or gland is attached, having a long neck or sleeve on the outside of which a thread is cut.

This said flange or sleeve is bored out to receive sliding sleeve and propeller shaft aforesaid. Screwed on to the out-side of this said neck or sleeve is a cylindrical piece of metal, the inner screwed portion of which has an internal projecting flange, which forms with the outer end of the long neck or sleeve aforesaid, a stuffing box, serving to prevent water from passing into the boat outside the shaft sleeve aforesaid. 15

The after part of this cylinder is bored out to loosely fit the outside of the propeller boss and envelopes the same as far as the propeller blades. 20

The propeller boss is screwed onto the propeller shaft, or it may be fixed thereto in any other convenient manner. In the case of the boss being screwed to the shaft I make the thread of the screw on the shaft left handed and that of the sleeve right handed or *vice-versa*, to prevent any chance of the propeller becoming detached. 25

Dated this 15th day of August 1898.

REGINALD W. BARKER,
Applicant's Agent,
Vulcan House, 56, Ludgate Hill, E.C.

COMPLETE SPECIFICATION.

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Improvements in and relating to Screw Propellers.

I, ARTHUR FREDERICK EVANS, of 11, Brunswick Walk, Cambridge, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:— 35

This invention relates to improvements in screw propellers and has special reference to means and devices for varying and reversing the pitch of said screw propellers.

The object of this invention is to provide a means whereby the blades of the screw propeller are fitted into the boss in such a manner as that they are well supported in the boss and the blades can be readily removed or replaced without disturbing any of the mechanism, and if required the whole of the propeller can be dismantled and removed by the simple process of unscrewing. Further, these improvements relieve the shaft from any unusual strains that may occur. 40

In carrying this invention into practice I use two, three or more blades as may be convenient. I provide a propeller boss fixed on to the propeller shaft and to the stern post of the boat or vessel in the manner to be hereinafter described. This boss is preferably cylindrical in shape and terminates at the outer or aft end in a cone. Two or more recesses are provided according to the number of blades, which recesses are turned in the boss at right angles to its axis, to a depth sufficient 50

Evans's Improvements in and relating to Screw Propellers.

to receive the stem of the propeller blade and at the inner end of each recess a smaller hole is bored and fitted to receive the end of the stem aforesaid. The bottom of each propeller blade has a collar or shoulder and terminates in a gudgeon or stem, having at its end the neck hereinbefore mentioned. I provide a gland
 5 which is screwed into the recess aforesaid which gland is bored out to receive the said stem which revolves in it the said gland having a shoulder or flange which rests on the surface of the boss.

The bottom of the said stem of the propeller blade is provided with a bush or sleeve, firmly secured and fixed to the stem by a taper pin or otherwise. This
 10 bush or sleeve is turned to exactly fit the space and is also deep enough to fit the recess between the underside of the gland and the bottom of the recess so that the upper and lower surface of the said bush or sleeve bears respectively against the gland and the bottom of the recess. On the outside of the said bush or sleeve, grooves are cut parallel to its axis, thus forming a pinion of the said bush or sleeve. This
 15 pinion so formed is actuated by two rods which serve the purpose of racks in the following manner:—Two holes are bored in the boss parallel to its axis, and which slightly intersect the circumference of the circle of the recesses aforesaid. Inserted in these holes are rods, which are cut on one side to form a rack which engages with the pinion bush or sleeve aforesaid. These two rods or racks
 20 are secured to a lug or flange forming part of a sleeve or bush which envelops the propeller shaft and is prolonged to the inside of the boat. This sleeve or bush which of course revolves with the shaft is carried on bearings in the usual manner and is actuated laterally by a reversing or regulating lever with a grooved sleeve and loose clamp or any convenient means for controlling
 25 and regulating the fore and aft motion of the bush or sleeve on the propeller shaft, the effect of which is, that the racks engage the pinions and so cause the propeller blades to revolve and thus the pitch of the blades is altered or reversed as may be required, as by this arrangement the blades can be rotated on their axes the whole or any part of a circle so that any lateral movement of the sleeve on the propeller
 30 shaft will cause the racks to revolve the pinions and thus revolve the propeller blades on their axes. A modification of this arrangement is preferably adopted by means of a lever pivotted to the framework of the boat attached to the aforesaid loose clamp and continued on to a handle and quadrant notched or otherwise. An adjustable stop or clamp is provided on the shaft which will have the effect of
 35 determining the amount of the pitch of the blades when the lever is placed full ahead.

A stuffing box is provided inside the boat between the sleeve aforesaid and the shaft to prevent the water from getting into the boat or vessel.

The attachment of the propeller to the boat is effected in the following manner:—
 40 On to the stern post of the vessel or other convenient fixture a flange or gland is attached, having a long neck or sleeve on the outside of which a thread is cut. This said flange or sleeve is bored out to receive the sliding sleeve and propeller shaft aforesaid. Screwed on to the outside of this said neck or sleeve is a cylindrical piece of metal, the inner screwed portion of which has an internal projecting
 45 flange, which forms with the outer end of the long neck or sleeve aforesaid, a stuffing box, serving to prevent water from passing into the boat outside the shaft sleeve aforesaid.

The after part of this cylinder is bored out to loosely fit the outside of the propeller boss and envelopes the same as far as the propeller blades.

50 The propeller boss is screwed on to the propeller shaft, or it may be fixed thereto in any other convenient manner. In the case of the boss being screwed to the shaft I make the thread of the screw on the shaft left-handed and that of the sleeve right-handed or *vice versa*, to prevent any chance of the propeller becoming detached.

55 In order that this invention may be readily understood reference is made to the accompanying drawings in which Fig. 1, represents a longitudinal section along the line of the propeller shaft, Fig. 2 a cross section through the propeller, Fig. 3,

Evans's Improvements in and relating to Screw Propellers.

a cross section through the propeller shaft shewing the sleeve, rods and flange in section, Fig. 4 is a sectional plan, shewing the rack and pinion arrangement for adjusting the pitch or position of the propeller blades. In these several views A is the propeller shaft, B the propeller boss screwed on the propeller shaft at C D is the sleeve sliding on the surface of the propeller shaft A terminating at the propeller end with a lug or flange E screwed or otherwise fixed to the said sleeve. This said lug or flange has two rods F F projecting from it and which fit into holes bored in the body of the propeller boss parallel to its axis. G G are the propellers which may be two, three or more in number as may be convenient. Recesses H H are provided in the propeller boss B according to the number of blades, and are turned or bored in the boss at right angles to its axis to a depth sufficient to receive the stem L of the propeller blade. At the inner end of this said recess, a further recess J is bored of a smaller diameter and fitted to receive the end of the stem of the propeller blade. The bottom of each propeller blade is provided with a collar or shoulder K and terminates in a gudgeon or stem L reduced to fit the aforesaid recess J. M is a gland screwed into the aforesaid recess H. N is a bush or sleeve turned to exactly fit the recess and fixed to the stem of the propeller blade by a pin n. O O are grooves cut parallel to the axis of said bush forming it into a pinion. The rods F, F' are also cut on one side at P P to form a rack which engages with the pinioned bush N. The propeller shaft A and sliding sleeve D revolves in the bush or bearing Q which passes through the stern post R and is fixed to it by bolts or screws through the flange S. T is a covering or supporting sleeve, screwed on to the aforesaid bush Q which has a prolonged sleeve U with hollowed end to form a stuffing box or gland for keeping the water out of the boat or vessel. W is a grooved sleeve screwed or keyed on to the sliding sleeve D on the propeller shaft A, which sleeve is actuated and caused to move fore or aft by the lever X and pins Y the said lever being pivotted to the framework of the boat or vessel at Z, a is an adjustable clamp of any convenient detail for regulating and controlling the travel of the lever X and sliding sleeve W and consequently the amount of the pitch of the propeller blades.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. In screw propellers the provision of a means for automatically adjusting or reversing the position of the propellers substantially as and for the purpose herein set forth and described and illustrated by the accompanying drawings.
2. The application of this invention to any form or kind of screw propeller substantially as and for the purpose herein set forth and described and illustrated by the accompanying drawings.

Dated this 15th day of May 1899.

REGINALD W. BARKER,
Applicant's Agent,
Vulcan House, 56, Ludgate Hill, London, E.C.